

/10

SEQUENCE LISTING

<110> U.S. Medical Research Institute of Infectious Diseases
Schmaljohn, Connie S.
Hooper, J. W.

<120> DNA Vaccines Against Hantavirus Infections

<130> Army-142

<140> 09/491,974

<141> 2000-01-27

<150> US 60/117,680

<151> 1999-01-29

<160> 4

<170> Microsoft Word, Office 97, IBM compatible

<210> 1

<211> 3651

<212> DNA

<213> Rattus norvegicus

<220>

<400> 1

tagtagtaga	ctccgcaaga	aacagcagtt	aaagaacaat	40
aggatcatgt	ggagttgct	attactggcc	gcttagttg	80
gccaggctt	tgcattaaaa	aatgtatttg	acatgagaat	120
tcaaggccc	cactca	actttggga	aacaagtgt	160
tcaggctata	cagaatttcc	cccactctca	ttacaggagg	200
cagaacagct	agtgcagag	agtcatgca	acatggacaa	240
ccaccagtca	ctctcaacaa	taaataaaatt	aaccaaggtc	280
atatggcga	aaaaagcaaa	tcaaggaatca	gcaaaccaga	320
attcatttga	agttgtggaa	agtgaagtca	gctttaaagg	360
gttgtgtatg	ttaaagcata	gaatggttga	agaatccat	400
agaaaatagga	gatcagtaat	ctgttatgat	ctagcctgta	440
atagtacatt	ctgtaaacca	actgtttata	tgattgttcc	480
tatacatgct	tgcaacatga	tgaaaagctg	tttgattggc	520
cttggccccct	acagaatcca	ggttgtctat	gaaaggacat	560
actgcactac	gggtatattg	acagaaggaa	aatgctttgt	600
ccctgacaag	gctgttgtca	gtgcattgaa	aagaggcatg	640
tatgctata	caagcataga	gacaatctgc	tttttattc	680
atcagaaagg	gaatacatat	aagatagtga	ctgccattac	720
atcagcaatg	ggctccaaat	gtaataatac	agatactaaa	760
gttcaaggat	attatatctg	tattattgg	ggaaactccg	800

RECEIVED
S: 25200
INTER 10002000



RECEIVED
S: 25200
TECH CENTER 1600/2000

RECEIVED

SEP 252000

TECH CENTER 1600/2000

ccctgtata	tgc	ccc	cgtct	g	gtgaagact	tca	ga	caat	840	
ggagg	ttt	t	tc	gg	atc	a	cat	gac	880	
gaccat	gacc	tac	cc	ggc	ga	aaat	tc	gca	920	
ttc	agg	gca	gat	agg	ca	aaat	cc	tgc	960	
ctccaaa	aaac	tta	aaat	tg	ctg	ttt	gc	agg	1000	
tca	act	cat	ca	act	at	gg	ct	g	1040	
gtc	gtt	cat	at	tag	tc	tt	at	ca	1080	
tca	gtc	agtc	tgt	aca	at	gc	act	cc	1120	
agg	ggc	ctaa	ttg	att	taa	ac	gg	act	at	1160
acc	ctt	gcaa	tgt	gtt	ctg	tc	gtt	atc	ag	1200
tta	cat	gtg	gc	ctt	ttc	ag	gg	at	tt	1240
act	tct	ccaa	tgt	gtc	ttg	taa	gg	ca	at	1280
gag	cag	ctga	gc	agc	att	at	ttt	gtc	t	1320
tga	tat	ggat	tg	at	ttt	gt	tt	gt	tc	1360
aca	aat	cct	ca	aaa	ac	at	ttt	at	ttt	1400
ata	act	att	aag	tct	ttt	tc	act	gtt	ta	1440
cc	att	catt	gt	att	ttt	gt	ttt	gtt	cc	1480
gg	ctt	gg	ca	ttt	tc	tc	ttt	gtt	cc	1520
g	ctt	gg	gt	ttt	tc	ta	ttt	at	ttt	1560
ag	tcc	ttt	taa	ttt	ttt	ttt	ttt	ttt	ttt	1600
ca	aa	gaga	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1640
agg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1680
ct	gt	taa	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1720
cata	ac	ctt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1760
tt	acc	act	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1800
tt	aca	aa	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1840
tta	aaaa	aa	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1880
gtt	acc	ga	act	ttt	ttt	ttt	ttt	ttt	ttt	1920
tttat	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	1960
tcc	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2000
tcc	ct	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2040
tc	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2080
tcc	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2120
cag	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2160
tgaa	aa	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2200
catt	gg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2240
at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2280
cact	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2320
aat	ag	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2360
gtac	agg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2400
gaag	cc	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2440
tac	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2480
ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2520
gcat	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2560
tct	ca	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2600
gagg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2640
tcact	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2680
aaacc	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2720
aaaa	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2760
tgg	aa	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2800
at	at	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2840
tca	act	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2880
gct	cgg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2920
gat	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	2960
tcc	agg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	3000
cgg	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	3040
cca	ac	ttt	ttt	ttt	ttt	ttt	ttt	ttt	ttt	3080

tttgttatgg	tgcagaaaagt	gtgacactct	cacgaggaca	3120
aaatactgtc	aaaatttaccg	ggaaagggtgg	ccatagtgg	3160
tcttcattca	aatgctgtca	tggaaagaa	tgttcatcaa	3200
ctggcctcca	agccagtgca	ccacatctgg	ataaggtaaa	3240
tggtatctct	gagttaaaaa	acgagaaaagt	ttatgtgac	3280
ggtgcacctg	aatgtggcat	tacttgttgg	tttaaaaaat	3320
caggtgaatg	ggttatgggt	ataatcaatg	ggaactgggt	3360
tgtcctaatt	gtcttgtgt	tactgctgct	ctttcttctt	3400
atcctgtga	gcatctgtg	tcctgttaga	aagcataaaaa	3440
aatcataaat	cccacctaac	aatcttcaca	tcatgtatcg	3480
attttcaaac	actttatcat	ttagaactta	acttggcact	3520
actatctgat	aactgacttt	catttttatt	tttatatgga	3560
ttaattacta	aaaaaaatac	tctcttctat	ctcccaatct	3600
tttattgatt	caccggggtg	ctgtcttgac	atctggcggc	3640
gtctactact	a			3651

<210> 2

<211> 1769

<212> DNA

<213> Rattus norvegicus

<220>

<400> 2

tagtagtaga	ctccctaaag	agctactaca	ctaacaagaa	40
aaatggcaac	tatggaagaa	atccagagag	aaatcaactgc	80
tcacgagggg	cagcttgtga	tagcacgcca	gaaggtaaag	120
gatgcagaaa	agcagttatga	gaaggatccct	gatgacttaa	160
acaagagggc	actgcattgt	cgggagagtg	tcgcagcttc	200
aatacaatca	aaaatttgc	aatttgcgg	ccaacttgcc	240
gacagattgc	agcagggaaag	aacatccggg	caggaccggg	280
atcctacagg	ggttagagcca	ggtgatcatc	ttaaggaaag	320
atcagcacta	agctacggg	atacactgg	cctgaatagt	360
cttgacattg	atgaacctac	aggacagaca	gctgattggc	400
tgaccataat	tgtctatctg	acatcattcg	ttgtcccgat	440
catcttgaag	gcactgtaca	tgttaacaac	acgaggtagg	480
cagacttcaa	aggacaacaa	ggggatgagg	atcagattca	520
aggatgacag	ctcatatgag	gatgtcaatg	gaatcagaaa	560
gccccaaacat	ctgtatgtt	caatgcacaa	cgcacatcc	600
agcatgaagg	ctgaagagat	aacaccagga	agattccgca	640
ctgcagtatg	tggactatat	cctgcacaga	taaaggcaag	680
gaatatggta	agccctgtca	tgagtgtatg	tgggttcttg	720
gcactggcaa	aagactggac	atcgagaatt	gaagaatggc	760
tcgggtgcacc	ctgcaatttc	atggcggagt	ctcttattgc	800
cgggagttta	tctggaaatc	ctgtgaatcg	tgactatatc	840
agacagagac	aaggtgcact	tgcaaggatg	gagccaaagg	880
aatttcaagc	cctcaggcaa	cattcaaagg	atgctggatg	920
tacactagtt	gaacatattg	agtaccatc	atcaatatgg	960
gtgtttgtcg	ggggccctga	taggtgtcca	ccaacatgt	1000
tgtttgtcg	aggatggct	gaatttaggtg	ccttcttttc	1040
tataacttcag	gatatgagga	acacaatcat	ggcttcaaaa	1080
actgtgggc	cagctgtatg	aaagcttcga	aagaaatcat	1120
cattctatca	atcataaccc	agacgcacac	aatcaatggg	1160
aatacaactg	gaccagagga	taattgttat	gtttatgggt	1200
gcctggggaa	aggaggcagt	ggacaacttt	catctcggtg	1240
atgacatgg	tccagagctt	cgtagcctgg	ctcagatctt	1280
gattgaccag	aaagtgaagg	aaatctcaa	ccaggaacct	1320

atgaaattat	aagtacataa	atatataatc	aatactaact	1360
ataggtaag	aaatactaat	cattagttaa	taagaatata	1400
gatttattga	ataatcatat	taaataatta	ggtaagttaa	1440
ctagtattta	gttaaggtag	ctaattgatt	tatatgattg	1480
tcacaattaa	atgtaatcat	aagcacaatc	actgccatgt	1520
ataatcacgg	gtatacgggt	ggtttcata	tgggaaacag	1560
ggggggctta	gggcaggc	accttaagtg	acctttttt	1600
gtatatatgg	atgtagattt	caattgatcg	aatactaatac	1640
ctactgtct	cttttctttt	ccttctcct	tctttactaa	1680
caacaacaaa	ctacctcaca	ccttaatata	tactacttta	1720
ttaagttgtt	aagttgtgtc	tttttgggga	gtaaggagg	1760
ctactacta				1769

<210> 3

<211> 8001

<212> DNA

<213> artificial sequence

<220>

<223> /note="M genome segment from SEOV, strain SR-11, subcloned into DNA vector pWRG7077"

<400> 3

gggggggggg	ggcgctgagg	tctgcctcgt	gaagaagg	40
ttgtgactc	ataccaggcc	tgaatcgccc	catcatccag	80
ccagaaaagt	agggaggccac	ggttcatgag	agcttgtt	120
taggtggacc	agttgggtat	tttgaacttt	tgcttgcca	160
cggaacggtc	tgcgttgtcg	ggaagatgcg	tgatctgatc	200
cttcaactca	gcaaaagttc	gatttattca	acaaagccga	240
cgtcccgatca	agtcagcgta	atgcctctgc	agtgttacaa	280
ccaattaacc	aattctgatt	agaaaaaactc	atcgagcatc	320
aaatgaaact	gcaatttatt	catatcagga	ttatcaatac	360
catatttttt	aaaaaggccgt	ttctgtatg	aaggagaaaa	400
ctcaccgagg	cagttccata	ggatggcaag	atcctggtat	440
cggctcgatca	ttccgactcg	tccaacatca	atacaaccta	480
ttaatttccc	ctcgtcaaaa	ataaggttat	caagtgagaa	520
atcaccatga	gtgacgactg	aatccgggtga	aatggcaaa	560
agcttatgca	tttcttcca	gacttggta	acaggccagc	600
cattacgctc	gtcatcaaaa	tcactcgcat	caaccaaacc	640
gttatttcatt	cgtgattgcg	cctgagcgag	acgaaatacg	680
cgcacgtgt	taaaaggaca	attacaaaca	ggaatcgaat	720
gcaaccggcg	caggaacact	gccagcgcat	caacaatatt	760
ttcacctgaa	tcaggatatt	tttctaatac	ctggatgt	800
gttttccccgg	ggatcgcagt	ggtgagtaac	catgcatcat	840
caggagtagc	gataaaatgc	ttgatggtcg	gaagaggcat	880
aaattccgtc	agccagttt	gtctgaccat	ctcatctgt	920
acatcattgg	caacgctacc	tttgcctatgt	ttcagaaaaca	960
actctggcgc	atcgggcttc	ccatacaatc	gatagattgt	1000
cgcacctgtat	tgccccacat	tatcgcgagc	ccatttatac	1040
ccatataaaat	cagcatccat	gttggattt	aatcgccg	1080
tcgagcaaga	cgtttcccgt	tgaatatggc	tcataaacacc	1120
ccttgttata	ctgttatgt	aagcagacag	ttttattgtt	1160
catgatgata	tattttatac	tttgcaatg	taacatcaga	1200
gatttgaga	cacaacgtgg	ctttcccccc	ccccccggca	1240
tgccctgcagg	tcgacataaa	tcaatattgg	ctattggcca	1280
ttgcatacgt	tgtatctata	tcataatatg	tacatttata	1320
ttggctcatg	tccaatatga	ccgcccattgtt	gacattgatt	1360

attgactagt	tattaatagt	aatcaattac	ggggtcatta	1400
gttcatagcc	cataatatgg	gttccgcgtt	acataactta	1440
cggtaaatgg	ccgcctcgt	gaccgccccaa	cgaccccccgc	1480
ccattgacgt	caataatgac	gtatgttccc	atagtaacgc	1520
caatagggac	tttccattga	cgtcaatggg	tggagtttt	1560
acggtaaact	gcccaactgg	cagtacatca	agtgtatcat	1600
atgccaagtc	cggcccccta	ttgacgtcaa	tgacggtaaa	1640
tggcccgct	ggcattatgc	ccagtagatg	accttacggg	1680
acttccctac	ttggcagttac	atctacgtat	tagtcatcgc	1720
tattaccatg	gtgatgcgg	tttggcagta	caccaatggg	1760
cgtggatagc	ggtttgactc	acggggattt	ccaagtctcc	1800
acccattga	cgtcaatggg	agtttgtttt	ggcacaaaaa	1840
tcaacgggac	tttccaaaat	gtcgtataaa	ccccggcccg	1880
ttgacgcaa	ttggcggtag	gcgtgtacgg	tgggaggtct	1920
atataagcag	agctcgttt	gtgaaccgtc	agatgcctg	1960
gagacgccat	ccacgcgtt	ttgacacctca	tagaagacac	2000
cgggaccgat	ccagcctccg	cggccgggaa	cgggtcattg	2040
gaacgcggat	tccccgtgcc	aagagtgacg	taagtaccgc	2080
ctatagactc	tataggcaca	ccctttggc	tcttatgcat	2120
gctatactgt	ttttggctt	gggcctataac	accccccgtc	2160
cttatgctat	aggtgtatgt	atagcttagc	ctataagggt	2200
gggttattga	ccattattga	ccactccct	attgggtgacg	2240
atactttcca	ttactaatcc	ataacatggc	tctttgccac	2280
aactatctct	attggctata	tgccaatact	ctgtccttca	2320
gagactgaca	cggactctgt	atttttacag	gatggggtcc	2360
catttattat	ttacaatttc	acatatacaa	caacgcgtc	2400
ccccgtgccc	gcagtttta	ttaaacataag	cgtggatct	2440
ccacgcgaat	ctcgggtacg	tgttccggac	atgggtctt	2480
ctccggtagc	ggcggagctt	ccacatccga	gccctggtcc	2520
catgcctcca	gcggctcatg	gtcgctcgcc	agtccttgc	2560
tcctaacagt	ggaggccaga	cttaggcaca	gcacaatgcc	2600
caccaccacc	agtgtccgc	acaaggccgt	ggcggtaggg	2640
tatgtgtctg	aaaatgagct	cggagattgg	gctcgcaccg	2680
tgacgcagat	ggaagactta	aggcagcgcc	agaagaagat	2720
gcaggcagct	gagttgttgt	attctgataa	gagtcaagagg	2760
taactcccg	tgcgggtctg	ttaacgggtgg	agggcagtgt	2800
agtcctgagca	gtactcgtt	ctgccgcgcg	cgccaccaga	2840
cataatagct	gacagactaa	cagactgttc	ctttccatgg	2880
gtctttctg	cagtcaccgt	ccaaagcttgc	ggccgcggat	2920
ctgcaggaat	tcggcacgag	agtagtagac	tccgcaagaa	2960
acagcagtt	aagaacaata	ggatcatgtg	gagtttgcta	3000
ttactggccg	ctttagttgg	ccaaaggctt	gcattaaaaa	3040
atgtatattga	catgagaatt	cagttgcccc	actcagtcaa	3080
ctttggggaa	acaagtgtgt	caggctataac	agaatttccc	3120
ccactctcat	tacaggaggc	agaacagacta	gtgccagaga	3160
gctcatgcaa	catggacaac	caccagtcac	tctcaacaat	3200
aaataaaatta	accaaggctca	tatggcgaa	aaaagcaaat	3240
caggaatcag	caaaccagaa	ttcatttga	gttgtggaaa	3280
gtgaagtctag	ctttaaagg	ttgtgtatgt	taaagcatag	3320
aatggttgaa	gaatcatata	gaaataggag	atcagtaatc	3360
tgttatgatc	tagcctgtaa	tagtacattc	tgtaaaccaa	3400
ctgtttatata	gattgttcct	atacatgctt	gcaacatgat	3440
gaaaagctgt	ttgattggcc	ttggccctta	cagaatccag	3480
gttgtctatg	aaaggacata	ctgcactacg	ggtatattga	3520
cagaaggaaa	atgcttgtc	cctgacaagg	ctgttgcag	3560
tgcattgaaa	agaggcatgt	atgctatagc	aagcatagag	3600
acaatctgct	tttttattca	tcagaaaggg	aatacatata	3640

agatagtgac	tgccattaca	tcagcaatgg	gctccaaatg	3680
taataataca	gatactaaag	ttaaggata	ttatatctgt	3720
attattggtg	gaaactccgc	ccctgtatat	gcccctgctg	3760
gtgaagactt	cagagcaatg	gaggaaaa	ctgggattat	3800
tacatcacca	catggagaag	accatgacct	acccggcga	3840
gaaatcgcaa	cgtaccagat	ttcagggca	atagaggcaa	3880
aatccctca	tacagtggc	tccaaaact	taaaattgac	3920
tgctttgca	ggtattccat	catactcata	aactagtata	3960
ttggctgctt	cagaagatgg	tcgtttcata	tttagtcctg	4000
gttatttcc	taacctaaat	cagtcagtct	gtgacaacaa	4040
tgcaactccct	ttaatctgga	ggggccta	tgatttaacg	4080
ggatactatg	aggcagtc	cccttgcata	gtgttctgt	4120
tcttatcagg	accaggtgt	tcatgtgagg	cctttcaga	4160
aggaggtatt	ttcaatatta	cttctccaa	gtgtctgg	4200
tctaagcaaa	atagatttag	agcagctgag	cagcagatta	4240
gcttgtctg	ccaaagagtt	gatatggata	ttatagtgta	4280
ctgtaatgg	cagaaaaaaa	caatccta	aaaaacatta	4320
gttataggcc	aatgtat	tactattaca	agtctttt	4360
cactgttacc	aggggttgc	cattctattt	ctattgagtt	4400
gtgtgttcca	gggttcat	gctgggcac	agctgcactt	4440
ttgattacat	tctgcttcg	ctgggtattt	attcctgc	4480
gtacatttagc	tattcttta	gtcctta	tctttgcaaa	4520
tatccttcat	acaagcaatc	aagagaaccg	attcaaagcc	4560
attctacgga	aaataaagga	ggagttgaa	aaaacaagg	4600
gttccatgg	ttgtgagatc	tgtaaatgt	agtgtaaac	4640
attaaaggaa	ttgaaggcac	ataaacat	atgtttcaa	4680
ggagagtgc	catattgtt	tacccactgt	gaaccgacag	4720
aaactgcaat	tcaggcacat	tacaaagttt	gtcaagccac	4760
ccaccgattc	agagaagatt	taaaaaagac	tgtaactcct	4800
caaaatattg	ggccagcgt	ttaccgaaca	ctaaatctt	4840
ttaggtataa	aagtaggtgt	tatattctga	caatgtggac	4880
tcttcttctc	attattgaat	ccatcctctg	ggcagaagt	4920
gcagcagaaa	tcccccttgt	ccctctctgg	acagataatg	4960
ctcatggcgt	tggagtg	cctatgcata	cggatcttga	5000
attagacttc	tctttgccat	ccagttctaa	gtacacatac	5040
aaaagacatc	tcacaaaccc	agttaatgac	caacagagt	5080
tctcattgca	tatagaaatt	gaaagtcaag	gcattgg	5120
tgctgttcat	catctggac	attggat	tgcaagatt	5160
aatctaaaaa	cctcattca	ttgttatgg	gcctgcacaa	5200
aatatcaata	cccatggcac	actgcaaaat	gccatttga	5240
gaaagattat	gatgtgaaa	atagctggc	ttgcaacccc	5280
ccagattgcc	caggggttgg	tacaggtt	actgcttgc	5320
gattataatct	agatcaattt	aagccggtag	gaacagcctt	5360
taaaattata	agtgtaaat	acagttagaa	agtgtgcgt	5400
cagtttgg	aagaacac	ttgtaaaaca	attgtat	5440
atgattgctt	tgtgactagg	catgccccaa	tatgtataat	5480
tggactgta	tctaagg	ctcaaggta	cactctacta	5520
tttctggggc	ccatggagg	aggtggata	atctttaa	5560
actgggtgtac	atctac	cacttggag	accctgg	5600
tgtcatgggt	ccaaaagata	aaccattt	ttgcctgaa	5640
ttcccaggc	aatttaggaa	aaaatgtaa	ttgcacaa	5680
ctccagttt	tgaatatgt	gaaaacatta	tatcaggct	5720
taagaaagta	cttgcacaa	ttgattctt	ccaatcatt	5760
aacacaagca	atatacactt	cactgtat	agaatgt	5800
ggagagaccc	tgtggcat	cttcgggatc	atattaat	5840
tgttatttct	aaagatattt	atttgaaaa	tttggctg	5880
aatccttgc	aagttaggct	ccaggcagca	aacatagaag	5920

gtgcctgggg	ttcaggtgtc	gggtttacac	tcacatgcaa	5960
ggtgtctctc	acagaatgcc	caacatttct	tacatcaata	6000
aaggcctgtg	acatggcaat	ttgttatggt	gcagaaagtg	6040
tgacactctc	acgaggacaa	aatactgtca	aaattaccgg	6080
gaaaagggtggc	catagtggtt	cttcattcaa	atgctgtcat	6120
gggaaagaat	gttcatcaac	tggcctccaa	gccagtgcac	6160
cacatctgga	taaggtaaat	ggtatctctg	agtttagaaaa	6200
cgagaaaagtt	tatgatgacg	gtgcacctga	atgtggcatt	6240
acttggttgg	ttaaaaaatc	aggtgaatgg	gttatggta	6280
taatcaatgg	gaactgggtt	gtcctaattt	tcttgggtgt	6320
actgctgctc	ttttcttta	tccctgttag	catctgtgt	6360
cctgttagaa	agcataaaaa	atcataaaatc	ccacctaaca	6400
atttcacat	catgtatcga	tttcaaaaca	ctttatcatt	6440
tagaacttaa	cttggcacta	ctatctgata	actgactttc	6480
atttttattt	ttatatggat	taattactaa	aaaaaatact	6520
ctctcgtgcc	gaattcgata	tcaagcttat	cgataccgtc	6560
gacctcgagg	gggggcccgg	tacccgggat	cctcgcataatc	6600
cctaggagga	ttaggcaagg	gctttagctc	acgctttgt	6640
gagggacaga	aatacaatca	ggggcagtat	atgaataactc	6680
catggagaaa	cccagatcta	cgtatgatca	gcctcgactg	6720
tgccttctag	ttgccagcca	tctgttgttt	gcccccccc	6760
cgtgccttcc	ttgaccctgg	aagggtgccac	tcccactgtc	6800
cttccttaat	aaaatgagga	aattgcatcg	cattgtctga	6840
gtaggtgtca	ttctattctg	gggggtgggg	tggggcagga	6880
cagaagggg	gaggattggg	aagacaatag	caggcatgt	6920
ggggatgcgg	tgggctctat	ggcttctgag	gcggaaagaa	6960
ccagctgggg	ctcgacagct	cgactctaga	attgcttcct	7000
cgtcactga	ctcgctgcgc	tccgtcggtt	ggctgcggcg	7040
agcggtatca	gctcactcaa	aggcggtaat	acggttatcc	7080
acagaatcag	gggataaacgc	agaaaaagaac	atgtgagcaa	7120
aaggccagca	aaaggccagg	aaccgtaaaa	aggccgcgtt	7160
gctggcggtt	ttccataggc	tccggcccccc	tgacgagcat	7200
cacaaaaaatc	gacgctcaag	tcagaggtgg	cgaaacccga	7240
caggactata	aagataccag	gcgtttcccc	ctggaagctc	7280
cctcgtgcgc	tctcctgttc	cgaccctgccc	gcttaccgg	7320
tacctgtccg	cctttctccc	ttcgggaagc	gtggcgcttt	7360
ctcaatgctc	acgctgttag	tatctcagtt	cggttaggt	7400
cgtcgcgtcc	aagctggct	gtgtgcacga	accccccgtt	7440
cagcccgacc	gctgcgcctt	atccggtaac	tatcgcttt	7480
agtccaaccc	ggtaagacac	gacttacgc	cactggcagc	7520
agccactggt	aacaggatta	gcagagcggag	gtatgttaggc	7560
ggtgctacag	agttcttgaa	gtgggtggct	aactacggct	7600
acactagaag	gacagtattt	ggtatctgcg	ctctgtgaa	7640
gccagttacc	ttcggaaaaa	gagttggtag	cttttgatcc	7680
ggcaaacaaa	ccaccgctgg	tagcgggtgg	ttttttgttt	7720
gcaagcagca	gattacgcgc	agaaaaaaaag	gatctcaaga	7760
agatcctttg	atctttctt	cggggtctga	cgctcagtgg	7800
aacgaaaact	cacgttaagg	gatttggtc	atcagattat	7840
caaaaaggat	cttcacctag	atccctttaa	attaaaaatg	7880
aagttttaaa	tcaatctaaa	gtatatatga	gtaaacttgg	7920
tctgacagtt	accaatgctt	aatcagtggag	gcacccatct	7960
cagcgatctg	tctatttcgt	tcatccatag	ttgcctgact	8000
c				8001

<211> 6050
 <212> DNA
 <213> artificial sequence
 <220>
 <223> /note="S genome segment from SEOV, strain SR-11, subcloned into DNA vector pWRG7077"
 <400> 4

gggggggggg	ggcgctgagg	tctgcctcgt	gaagaaggtg	40
ttgtcactc	ataccaggcc	tgaatcgccc	catcatccag	80
ccagaaaagt	agggagccac	ggttcatgag	agctttgtt	120
tagtgtggacc	agttgggtat	tttgaacttt	tgcttgcca	160
cggAACGGTC	tgcgttgcg	ggaagatgcg	tgatctgatc	200
cttcaactca	gcaaaaagttc	gatttattca	acaAAAGCCGC	240
cgtccccgtca	agtcagcgta	atgcctcgcc	agtgttacaa	280
ccaattaacc	aattctgatt	agaaaaaaactc	atcgagcatac	320
aaatgaaact	gcaatttatt	catatcagga	ttatcaatac	360
catattttt	aaaaaggccgt	ttctgtatag	aaggagaaaa	400
ctcacccgagg	cagttccata	ggatggcaag	atccttggtat	440
cggctctgcga	ttccgactcg	tccaacatca	atacaaccta	480
ttaatttccc	ctcgtcaaaa	ataaggttat	caagtggagaa	520
atcacatga	gtgacgactg	aatccgggtga	aatggcaaa	560
agcttatgca	tttcttcca	gacttggttca	acaggccagc	600
cattacgctc	gtcatcaaaa	tcactcgcat	caaccaaacc	640
gttatttatt	cgtgatgcg	cctgagcgag	acgaaatacg	680
cgatecgctgt	taaaaaggaca	attacaaaaca	ggaatcgaat	720
gcaaccggcg	caggaacact	gccagcgcat	caacaatatt	760
ttcacctgaa	tcaggatatt	cttctaatac	ctggaatgct	800
gttttcccg	ggatgcag	ggtgagtaac	catgcatacat	840
caggagtagc	gataaaatgc	ttgatggtcg	gaagaggcat	880
aaattccgtc	agccagttt	gtctgaccat	ctcatctgt	920
acatcattgg	caacgcgtacc	tttgcctatgt	ttcagaaaca	960
actctggcgc	atcgggcttc	ccatacaatc	gatagattgt	1000
cgcacctgat	tgcccgacat	tatcgcgagc	ccatttatac	1040
ccatataaat	cagcatccat	gttggaaattt	aatcgccggcc	1080
tcgagcaaga	cgtttcccg	tgaatatggc	tcataaacacc	1120
ccttgtatta	ctgtttatgt	aagcagacag	ttttattgtt	1160
catgatgata	tatTTTATC	tttgatgcaatg	taacatcaga	1200
gattttgaga	cacaacgtgg	ctttcccccc	ccccccggca	1240
tgctgcagg	tcgacataaa	tcaaatattgg	ctattggcca	1280
ttgcatacgt	tgtatctata	tcataatatg	tacatttata	1320
ttggctcatg	tccaaatatga	ccggccatgtt	gacattgatt	1360
attgactagt	tattaatagt	aatcaattac	ggggtcatta	1400
gttcatagcc	catatatgga	gttccgcgtt	acataactta	1440
cggtaaatgg	cccgcctcg	gaccgccccaa	cgacccccgc	1480
ccattgacgt	caataatgac	gtatgttccc	atagtaacgc	1520
caataggggac	tttccattga	cgtcaatggg	tggagtttt	1560
acggtaaact	gcccacttgg	cagtacatca	agtgtatcat	1600
atgccaagtc	cggcccccta	ttgacgtcaa	tgacgtaaa	1640
tggcccgct	ggcattatgc	ccagtgatcg	accttacggg	1680
actttctac	ttggcagtagc	atctacgtat	tagtcatcgc	1720
tattaccatg	gtgatgcggt	tttggcagta	caccaatggg	1760
cgtggatagc	ggtttgactc	acggggattt	ccaagtctcc	1800
accccattga	cgtcaatggg	agtttggttt	ggcacaaaaa	1840
tcaacgggac	tttccaaaat	gtcgtataaa	ccccggcccg	1880
ttgacgcaaa	tgggcggtag	gcgtctacgg	tgggaggtct	1920
atataagcag	agctcggtt	gtgaaccgtc	agatcgctg	1960
gagacgccat	ccacgcgtt	ttgacctcca	tagaagacac	2000

cgggaccgat	ccagcctccg	cggccggaa	cggcattg	2040
gaacgcggat	tccccgtgcc	aagagtgcgt	aagtaccgc	2080
ctatacgactc	tataggcaca	ccccttggc	tcttatgcat	2120
gctatactgt	ttttggcttg	gggcctatac	accccgctc	2160
cttatgctat	aggtgatggt	atagcttagc	ctataggtgt	2200
gggttattga	ccattattga	ccactccccc	attggtgacg	2240
atactttcca	ttactaatcc	ataacatggc	tctttgccac	2280
aactatctct	attggctata	tgccaatact	ctgtcctca	2320
gagactgaca	cggactctgt	atttttacag	gatgggtcc	2360
catttattat	ttacaatttc	acatatacaa	caacccgtc	2400
ccccgtgccc	gcagtttta	ttaaacatacg	cgtggatct	2440
ccacgcgaat	ctcgggtacg	tgttccggac	atgggcttct	2480
ctccggtagc	ggcggagctt	ccacatccga	gccctggtcc	2520
catgcctcca	gcggctcatg	gtcgctcggc	agtccttgc	2560
tcctaacagt	ggaggccaga	cttaggcaca	gcacaatgcc	2600
caccaccacc	agtgtgccgc	acaaggccgt	ggcggtaggg	2640
tatgtgtctg	aaaatgagct	cggagattgg	gctcgacccg	2680
tgacgcagat	ggaagactta	aggcagcggc	agaagaagat	2720
gcaggcagct	gagttgttgt	attctgataa	gagtcaagagg	2760
taactcccg	tgcggtgctg	ttaacgggtgg	agggcagtgt	2800
agtcgtgagca	gtactcgttg	ctgccgcgcg	cgcaccaga	2840
cataatagct	gacagactaa	cagactgttc	ctttccatgg	2880
gtctttctg	cagtcaccgt	ccaagcttgc	ggccaattcg	2920
gcacgagaga	gtagtagact	ccctaaagag	ctactacact	2960
aacaagaaaa	atggcaacta	tgaagaaat	ccagagagaa	3000
atcaagtctc	acgaggggca	gcttgtgata	gcacgcaga	3040
aggtcaagga	tgcagaaaag	cagtatgaga	aggatccctga	3080
tgacttaaac	aagagggcac	tgcattgatcg	ggagagtgtc	3120
gcagcttcaa	tacaatcaa	aattgtatgaa	ttgaagcgcc	3160
aacctggcga	cagattgcag	caggaaagaa	catccggcga	3200
ggaccgggat	cctacagggg	tagagccagg	tgatcatctt	3240
aaggaaagat	cagcactaag	ctacggaaat	acactggacc	3280
tgaatagtct	tgacattgtat	gaacctacag	gacagacagc	3320
tgattggctg	accataatttgc	tctatctgac	atcattcg	3360
gtcccgatca	tcttqaaggc	actgtacatg	ttaacaacac	3400
gaggtaggca	gacttcaaag	gacaacaagg	ggatgaggat	3440
cagattcaag	gatgacagct	catatgagga	tgtcaatgga	3480
atcagaaagc	ccaaacatct	gtatgtgtca	atgc当地acg	3520
cccaatccag	catgaaggct	gaagagataa	caccaggaag	3560
atccgcact	gcagttgtg	gacttatatcc	tgcacagata	3600
aaggcaagga	atatggtaag	ccctgtcatg	agtgttagttg	3640
ggttcttggc	actggcaaaa	gactggacat	cgagaattga	3680
agaatggctc	ggtgcaccc	gcaattatcat	ggcggagtct	3720
cttattgccc	ggagtttatac	tggaaatcct	gtgaatcg	3760
actatatcag	acagagacaa	ggtgcaacttg	caggatgga	3800
gccaaggaa	tttcaagccc	tcaggcaaca	ttcaaaaggat	3840
gctggatgt	caactgtg	acatattgag	tcaccatcat	3880
caatatgggt	gtttgctggg	gccctgtata	ggtgtccacc	3920
aacatgctt	tttgcggag	ggatggctga	attaggtgcc	3960
ttctttctt	tacttcagga	tatgaggaac	acaatcatgg	4000
cttcaaaaac	tgtggcaca	gctgtatgaaa	agcttcgaaa	4040
gaaatcatca	ttctatcaat	catacctcag	acgcacacaa	4080
tcaatggaa	tacaactgga	ccagaggata	attgttatgt	4120
ttatgggtgc	ctggggaaag	gaggcagtgg	acaacttca	4160
tctcggtat	gacatggatc	cagagcttcg	tagcctggct	4200
cagatcttga	ttgaccagaa	agtgaagggaa	atctcaaacc	4240
aggAACCTAT	gaaattataa	gtacataaaat	atataatcaa	4280

tactaactat	aggtaagaa	atactaata	ttagttaata	4320
agaatataga	tttattgaat	aatcatatta	aataattagg	4360
taagttaact	agtatttagt	taagttagct	aattgattta	4400
tatgattgtc	acaattaaat	gtaatcataa	gcacaatcac	4440
tgccatgtat	aatcacgggt	atacgggtgg	tttcataatg	4480
gggaacaggg	tgggcttagg	gccaggtcac	cttaagtgac	4520
cTTTTTGT	atataatggat	gtagatttca	attgatcgaa	4560
tactaattcct	actgtcctct	tttctttcc	tttctccttc	4600
tttactaaca	aactacctcg	tGCCGAATTG	gcccggatc	4640
ctcgcaatcc	ctaggaggat	taggcaaggg	cttgagctca	4680
cgtcttgtg	agggacagaa	atacaatca	gggcagtata	4720
tgaataactcc	atggagaaac	ccagatctac	gtatgatcg	4760
cctcgactgt	gccttctagt	tGCCAGCCAT	ctgttgttg	4800
cccccccccc	gtgccttcct	tgaccctgg	aggtgccact	4840
cccaactgtcc	tttcctaata	aaatgaggaa	attgcatcgc	4880
attgtctgag	taggtgtcat	tctattctgg	gggggtgggt	4920
ggggcaggac	agcaaggggg	aggattggg	agacaatagc	4960
aggcatgctg	gggatgcgg	gggctctatg	gcttctgagg	5000
cggaaagaac	cagctggggc	tcgacagctc	gactctagaa	5040
ttgcttcctc	gctcaactgac	tcgctgcgc	cggcggtcg	5080
gctgcggcga	gcggtatcag	ctcaactcaaa	ggcggtata	5120
cgttatcca	cagaatcagg	ggataacgc	ggaaagaaca	5160
tgtgagcaaa	aggccagcaa	aaggccagga	accgtaaaaa	5200
ggccgcgtt	ctggcggtt	tccataggct	ccgccccct	5240
gacgagcatc	acaaaaatcg	acgctcaagt	cagaggtggc	5280
gaaacccgac	aggactataa	agataaccagg	cgttttcccc	5320
tggaaagctcc	ctcgtgcgc	ctccctgttcc	gaccctgcgc	5360
cttaccggat	acctgtccgc	ctttctccct	tcgggaagcg	5400
tggcgcttcc	tcaatgctca	cgctgttaggt	atctcagtcc	5440
ggtttaggtc	gttcgcctca	agctggctgt	tgtgcacgaa	5480
ccccccgttc	agccccgaccg	ctgcgcctta	tccggttaact	5520
atcgtcttga	gtccaaacccg	gtaagacacg	acttatacgcc	5560
actggcagca	gccactggta	acaggattag	cagagcgagg	5600
tatgttaggcg	gtgctacaga	gttcttgaag	tggtgcccta	5640
actacggcta	cactagaagg	acagtatttg	gtatctgcgc	5680
tctgctgaag	ccagttacct	tccggaaaaag	agttggtagc	5720
tcttgatccg	gcaaacaac	caccgctgg	agcggtgg	5760
ttttgttttgc	caagcagcag	attacgcgc	gaaaaaaaaagg	5800
atcctaagaa	gatccttga	tctttctac	ggggctgtac	5840
gctcagtgg	acgaaaactc	acgttaaggg	atttggtca	5880
ttagattatc	aaaaaggatc	ttcacctaga	tcctttaaa	5920
ttaaaaaatga	agttttaaat	caatctaaag	tatataatgag	5960
taaacttggt	ctgacagttt	ccaatgctta	atcagtggg	6000
cacctatctc	agcgatctgt	ctatTCGTT	catccatagt	6040
tgccctgactc				6050